

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/087,928
Attorney Docket No.: Q68813

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): An image processing method for smoothing digital data for an input image and for removing noise included in the digital data, the method comprising:

 ~~an edge information calculation step of extracting an edge of the image from the digital data,~~

 ~~and calculating edge information including~~ comprising a grade and a direction of a slope of the extracted edge;

 ~~a filter information selection step of selecting~~ preset filter information ~~that is set in advance based on the~~ calculated edge information ~~obtained at the edge information calculation step;~~ and

 ~~a processing step of smoothing all of the digital data based on the~~ selected filter information ~~selected at the filter information selection step.~~

2. (currently amended): The image processing method according to claim 1, wherein: [[, at]]

 the filter information comprises first filter information with a smoothing range described by a circle shape and second filter information with a smoothing range described by an elliptical shape; ~~selection step,~~

 when the grade of the slope is ~~small~~ smaller than a threshold, the first filter information is selected; ~~whose smoothing range describes a circular shape, and~~

when the grade of the slope is ~~large~~ larger than the threshold, the second filter information is selected ~~whose smoothing range describes an elliptical shape.~~

3. (currently amended): The image processing method according to claim 1, wherein, the ~~at the filter information selection step,~~ filter information is selected for which the direction of the slope corresponds to ~~the~~ an inclination of ~~the~~ a smoothing range.

4. (currently amended): The image processing method according to claim 1 further comprising:

~~a smoothing strength calculation step of calculating luminance using the digital data; [[,~~
~~and]]~~

~~calculating a smoothing strength using the luminance; and [[,]]~~

selecting wherein, ~~at the filter information selection step, filter information is selected~~
~~that corresponds~~ corresponding to the calculated edge information ~~obtained at the edge~~
~~information calculation step and the~~ calculated smoothing strength ~~obtained at the smoothing~~
~~strength calculation step.~~

5. (currently amended): An image processing method, for smoothing digital data for an input image and removing noise included in the digital data, the method comprising:

~~an edge information calculation step of extracting an edge of the image from the digital~~
~~data;~~

~~and~~ calculating edge information ~~that includes~~ comprising a grade and a direction of a slope of the edge;

~~a filter information generation step of generating filter information based on the~~
calculated edge information obtained at the edge information calculation step; and

~~a processing step of smoothing all of the digital data of the input image based on the~~
generated filter information generated at the filter information generation step.

6. (currently amended) A recording medium storing a computer program intended for use
with ~~for causing an~~ image processing apparatus [[,]] which includes an input unit for entering
image data, a processor for processing digital data output by the input unit, and a recording unit
for recording filter information used to process the digital data, to smooth digital data for an
input image and to remove noise included in the digital data, the image processing apparatus
~~being caused by the computer program to perform~~ computer program defining operations,
comprising:

an edge information calculation step of extracting an edge of the image from the digital
data received from the input unit, and calculating edge information ~~including~~ comprising a grade
and a direction of a slope of the edge;

a filter information reading step of ~~reading out~~ selecting specific filter information stored
in the recording unit based on the edge information obtained at the edge information calculation
step; and

a processing step of smoothing all of the digital data received from the input unit based on the filter information ~~read~~-selected at the filter information reading step.

7. (currently amended): The recording medium according to claim 6, wherein the filter information ~~read~~-selected at the filter information reading step is so set that when the grade of the slope is small, a smoothing range describes a circular shape, and when the grade of the slope is large, the smoothing range describes an elliptical shape.

8. (currently amended) The recording medium according to claim 6, wherein the filter information ~~read at~~-selected at the filter information reading step is so set that an inclination of ~~the~~-a smoothing range corresponds to the direction of the slope.

9. (currently amended): The recording medium according to claim 6, wherein the ~~image processing apparatus is caused by the computer program to further perform~~operations further comprise:

a smoothing strength calculation step of calculating luminance using the digital data, and of calculating a smoothing strength using the luminance,

wherein, at the filter information reading step, specific filter information is ~~read out~~ selected from the recording unit based on the edge information obtained at the edge information calculation step and the smoothing strength obtained at the smoothing strength calculation step.

10. (currently amended): A recording medium storing a computer program intended for use with ~~for causing an~~ image processing apparatus [[,]] which includes an input unit for entering image data and a processor for processing digital data output by the input unit, to smooth digital data for an input image and to remove noise included in the digital data, ~~the image processing apparatus being caused by the computer program to perform~~ computer program defining operations, comprising:

an edge information calculation step of extracting an edge of the image from the digital data, and calculating edge information that ~~includes~~ comprises ~~the a~~ grade and ~~the a~~ direction of a slope of the edge;

a filter information generation step of generating filter information based on the edge information obtained at the edge information calculation step; and

a processing step of smoothing all of the digital data received from the input unit based on the filter information generated at the filter information generation step.

11. (currently amended): An image processing apparatus comprising:

an image input unit for receiving image data and outputting the image data as digital data;

an edge calculation unit for extracting an edge of an image from the digital data output by the image input unit, and for calculating edge information that ~~includes~~ comprises ~~the a~~ grade and ~~the a~~ direction of a slope of the edge;

a recording unit for storing filter information that is set in correlation with the edge information;

a filter information selection unit for, based on the edge information calculated by the edge information calculation unit, selecting filter information stored in the recording unit; and

a smoothing unit for smoothing all of the digital data output by the image input unit based on the filter information selected by the filter information selection unit.

12. (currently amended): An image processing apparatus according to claim 11, further comprising:

a smoothing strength calculation unit for calculating luminance using the digital data, and calculating a smoothing strength using the luminance,

wherein, on the recording unit, the filter information is stored that is set in correlation with the edge information obtained by the edge information calculation unit and the smoothing strength obtained by the smoothing strength calculation unit.

13. (currently amended): An image processing apparatus comprising:

an image input unit ~~for~~ receiving image data and outputting the image data as digital data;

an edge calculation unit ~~for~~ extracting an edge of an image from the digital data output by the image input unit, and calculating edge information ~~that includes comprising the a~~ grade and ~~the a~~ direction of a slope of the edge;

a filter information generation unit ~~for~~ generating filter information stored in the recording unit based on the edge information calculated by the edge information calculation unit;

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/087,928
Attorney Docket No.: Q68813

a smoothing unit ~~for~~ smoothing all of the digital data output by the image input unit based on the filter information generated by the filter information generation unit; and
a recording unit for storing the smoothed digital data.

14. (new): The image processing method according to claim 1, further comprising inputting image data and converting image data into the digital data.

15. (new): The image processing method according to claim 1, wherein a shape of a smoothing range depends on the grade of the slope.